Docket No. AUS920010454US1

THIRD PARTY BILLING INTERVENTION FOR MOBILE INTERNET ACCESS

BACKGROUND OF THE INVENTION

1. Technical Field:

The present invention relates generally to the automated billing of Internet access. More specifically, the present invention provides a method, computer program, and data processing system for billing third-parties for users' Internet access, when certain pages are accessed by those users.

2. Description of Related Art:

Since the introduction of the World Wide Web and the subsequent commercialization of the Internet, the world has become a considerably more connected place. No longer bound to the primitive communications interfaces of the past, the Internet is now host to a variety of powerful communications media, including interactive hypertext browsing (the World Wide Web), instant messaging, streaming video and audio, and multimedia electronic mail.

Hypertext is a method of organizing textual and graphical information on a computer screen. Information is organized into "pages," which resemble printed pages in a book or (perhaps more accurately) printed scrolls (since a hypertext page can be of any length). The primary difference between hypertext and the printed word, however, lies in the fact that hypertext pages can contain links. That is, a portion of a hypertext document, such as a phrase or a graphic, may be made

sensitive to clicking by the mouse such that when the user clicks on that portion, the user is directed to a new page or a different section of the current page. For instance, it is a common practice to make bibliographic citations into links. When a user clicks on one of these citations, the cited text appears on the screen. Hypertext documents are displayed using a program called a "browser."

The largest and best-known repository of hypertext documents is the World Wide Web, a loosely bound collection of publicly accessible hypertext documents stored on computers the world over. The World Wide Web has become the preferred Internet medium for publishable information as well as for providing such interactive features as online shopping - to the extent that the terms Internet and World Wide Web are virtually synonymous to some.

Browsers can download hypertext documents from a server with the HyperText Transfer Protocol (HTTP). HTTP allows a browser to request documents or files from a server and receive a response. In addition, when browser users enter information into a form embedded into a hypertext page, the browser transmits the information to a server using HTTP. Form information can then be passed along to applications residing on the server by way of the Common Gateway Interface (CGI). Those applications can then return a result, which may be written in HTML.

Likewise, the mobile telephone has ushered in a new era in interpersonal communications. While the late 1990s' widespread consumer interest in the Internet made ours a wired world, technical advances and increased consumer appeal are ushering in a new "wireless world."

A number of mobile telephone manufacturers and service providers cater to a growing base of mobile telephone subscribers.

The logical extension of these two technological revolutions is mobile (or wireless) Internet access. A number of devices and services today allow users to access the Internet from virtually anywhere. Portable devices that may be used to access the Internet include personal digital assistants and mobile telephones.

Wireless services, such as mobile telephone usage, are generally billed based on the amount of time spent "on the air" or "airtime." Mobile Internet users, therefore, have a disincentive to spend time simply browsing through websites. Businesses that rely on a web presence for marketing purposes are somewhat disadvantaged by mobile Internet service, in that mobile Internet users are less likely to "window shop" online, as they must pay for the time.

Therefore, it would be desirable for businesses to have a way of enticing mobile Internet customers that must pay for airtime to browse their websites freely.

SUMMARY OF THE INVENTION

~~Accordingly, the present invention provides a~~ A method, computer program, and data processing system for accepting Internet access charges for a user examining a particular website and, ~~The present invention~~ enables businesses, organizations, and individuals to entice users that must pay for Internet access time to browse their websites freely without concern for cost.

BRIEF DESCRIPTION OF THE DRAWINGS

The novel features believed characteristic of the invention are set forth in the appended claims. The invention itself, however, as well as a preferred mode of use, further objectives and advantages thereof, will best be understood by reference to the following detailed description of an illustrative embodiment when read in conjunction with the accompanying drawings, wherein:

Figure 1 is a diagram of a mobile Internet billing intervention system in accordance with a preferred embodiment of the present invention;

Figure 2 is an external view of a personal digital assistant (PDA) that may be used in a preferred embodiment of the present invention;

Figure 3 is a block diagram of a personal digital assistant (PDA) that may be used in a preferred embodiment of the present invention;

Figure 4 is a block diagram of a server that may be used in a preferred embodiment of the present invention;

Figure 5 is a diagram of the headers in an Internet Protocol (IP) data packet, which may be used to identify source and destination addresses in a preferred embodiment of the present invention'

Figure 6 is a diagram depicting an operation of intervening in mobile Internet billing in accordance with a preferred embodiment of the present invention;

Figure 7 is a diagram depicting the continuation of the process depicted in **Figure 6**;

Figure 8 is a diagram depicting an operation of restoring default billing in accordance with a preferred embodiment of the present invention;

Figure 9 is a diagram of a billing database in accordance with a preferred embodiment of the present invention; and

Figure 10 is a flowchart representation of a process of mobile Internet billing intervention in accordance with a preferred embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Figure 1 is a diagram depicting an overall view of a mobile Internet billing intervention system in accordance with a preferred embodiment of the present invention. A mobile Internet user accesses the Internet through a wireless link between personal digital assistant (PDA) **100** and antenna station **102**, operated by a mobile Internet service provider (mobile ISP). PDA **100** could be, for instance, a Palm VII organizer, manufactured by Palm, Inc. One of ordinary skill in the art will recognize that PDA **100** is a mere representative of a number of wireless devices that may be used to provide Internet access, including certain cellular telephones, laptop computers, and the like. Supervisory server **104** is associated with antenna station **102** and monitors network traffic passing through antenna station **102**. Supervisory server **104** also controls billing database **106**, which stores information regarding the billing of mobile ISP customers for mobile Internet access.

Antenna station **102** is connected to the broader Internet **108**, which is connected to, among other things, a number of web servers such as web server **110**, which provides World Wide Web media content to web clients, such as PDA **100**.

Figure 2 is an external view of a PDA **200** that may be used in a preferred embodiment of the present invention. PDA **200** includes a touch-sensitive screen **210**, which in **Figure 2** is depicted as displaying a web

browser **220**. PDA **200**, being a type of general-purpose computer, is capable of operating a number of different software packages. Web browser **220** may execute on top of an operating system, such as the PalmOS operating system, developed by Palm, Inc.

Stylus **230** may be used to apply pressure to touch-sensitive screen **210**. Thus, stylus **230** may be used as a pointing device, like a mouse or trackball. Stylus **230** may also be used like a pen in conjunction with writing surface **240**, which is also touch-sensitive, to write alphanumeric and other character-based data. Keys, such as key **245** provide an additional input mechanism.

Antenna **250** provides a wireless communication link to other devices. Antenna **250** allows PDA **200** to communicate with an antenna station, such as antenna station **102** in **Figure 1**, so as to gain access to the Internet or other network. Cradle connector **260** allows PDA **200** to be connected through a PDA cradle interface to a desktop or laptop computer for exchange of information.

Figure 3 is a block diagram of a PDA that may be used in a preferred embodiment of the present invention. Local bus **300** connects the various components of the PDA. Processing unit **302**, connected to bus **300**, executes instructions stored in memory **304**, which is also connected to local bus **300**. Processing unit **302** may comprise a single processor, such a microprocessor, or it may comprise multiple processors so as to allow the execution of multiple instructions simultaneously. Any number of processors could be used in processing unit **302**. An example of a suitable processor is the Dragonball EZ processor, manufactured by Motorola, Inc.

Many different types of memory are available and suitable for use within the PDA depicted in **Figure 3**. Memory is generally classified as volatile and non-volatile memory. Volatile memory types store data temporarily while the data processing system is operating, but lose their data once the data processing system's power is turned off. Most volatile memory in use today is "random access memory," (RAM) meaning that data and instructions may be read from or written to any portion of the memory at any time. Common random access memory types well-known to those skilled in the art include static random access memory (SRAM) and dynamic random access memory (DRAM).

Non-volatile memory types retain their information, even when the data processing system is turned off. Non-volatile memory types are generally referred to as "read-only memory" (ROM). Many types of non-volatile memory exist. Programmable read-only memory (PROM) may be programmed with permanent data using a PROM programming device. Erasable programmable read-only memory (EPROM) can be erased of its data contents, through such means as ultraviolet radiation or through electric current (as with an electrically-erasable PROM or EEPROM). Flash memory and non-volatile random-access memory (NVRAM) are two memory media that may be written to and erased within working circuits without the use of a memory programming device.

Memory **304** may store data to be operated upon by processing unit **302**, it may store instructions to be executed by processing unit **302**, or it may store both. In **Figure 3**, a single memory module is depicted, although many memory arrangements are possible. Cache memory,

which is a high speed memory used for temporary storage of data and instructions to be stored to read from a primary bank of memory may be used. Also, certain systems designed with what is known as a "Harvard architecture" use separate memory and buses for data and instructions.

Alternatively, a microcontroller, such as an 8051 microcontroller, manufactured by Intel Corporation, could be used in place of processing unit **302** and memory **304**. A microcontroller is a monolithic integrated circuit containing both a processor unit and memory.

Touch-sensitive screen **306** provides both input and output for the PDA. Touch-sensitive screen **306** preferably comprises some kind of liquid crystal display (LCD) covered by a transparent digitizer pad. The digitizer is sensitive to touch and can detect the X and Y coordinates of a point of contact with the pad. Keys **308** provide additional input means for the PDA.

Cradle adapter **310** allows PDA to be connected to a desktop or laptop computer for data exchange. Wireless communications unit **312** provides circuitry for wireless data interchange through antenna **314**. Wireless communications unit **312** and antenna **314** may be used for providing mobile Internet access.

Those of ordinary skill in the art will appreciate that the hardware depicted in **Figure 3** may vary. For example, other peripheral devices may be used in addition to or in place of the hardware depicted. The depicted example is not meant to imply architectural limitations with respect to the present invention.

Referring to **Figure 4**, a block diagram of a data processing system that may be implemented as a server,

such as server **104** or server **110** in **Figure 1**, is depicted in accordance with a preferred embodiment of the present invention. Data processing system **400** may be a symmetric multiprocessor (SMP) system including a plurality of processors **402** and **404** connected to system bus **406**. Alternatively, a single processor system may be employed. Also connected to system bus **406** is memory controller/cache **408**, which provides an interface to local memory **409**. I/O bus bridge **410** is connected to system bus **406** and provides an interface to I/O bus **412**. Memory controller/cache **408** and I/O bus bridge **410** may be integrated as depicted.

Peripheral component interconnect (PCI) bus bridge **414** connected to I/O bus **412** provides an interface to PCI local bus **416**. A number of modems may be connected to PCI bus **416**. Typical PCI bus implementations will support four PCI expansion slots or add-in connectors. Communications links to other data processing systems may be provided through modem **418** and network adapter **420** connected to PCI local bus **416** through add-in boards.

Additional PCI bus bridges **422** and **424** provide interfaces for additional PCI buses **426** and **428**, from which additional modems or network adapters may be supported. In this manner, data processing system **400** allows connections to multiple network computers. A memory-mapped graphics adapter **430** and hard disk **432** may also be connected to I/O bus **412** as depicted, either directly or indirectly.

Those of ordinary skill in the art will appreciate that the hardware depicted in **Figure 4** may vary. For example, other peripheral devices, such as optical disk

drives and the like, also may be used in addition to or in place of the hardware depicted. The depicted example is not meant to imply architectural limitations with respect to the present invention.

The data processing system depicted in **Figure 4** may be, for example, an IBM eServer pSeries, a product of International Business Machines Corporation in Armonk, New York, running the Advanced Interactive Executive (AIX) operating system.

Network communications in the system depicted in **Figure 1** will preferably be conducted using the TCP/IP suite of network protocols. Data transmitted using TCP/IP is sent in the form of packets. These packets contain various headers that include useful information regarding the source, destination, and characteristics of the information being transmitted. **Figure 5** depicts headers **500** used in IP (Internet Protocol) packets. Source IP address **502** tells where a packet originates from. Destination IP address **504** tells where a packet is being transmitted to. Thus, a server such as supervisory server **104** in **Figure 1**, that monitors packets, can identify when a packet is being sent from one machine in a network to another. Thus in **Figure 1**, supervisory server **104** can monitor the headers of IP packets passing through antenna station **102** to note when PDA **100** is communicating with **110**.

Figure 6 is a diagram depicting a process of billing intervention in accordance with a preferred embodiment of the present invention. PDA **100** issues an HTTP request **600** for a web page located on web server **110**. The information providers providing the content on web server

110 have agreed to pay for mobile Internet charges for mobile Internet users that visit the web site(s) on web server **110**. HTTP request **600** is sent via wireless link to antenna station **102**.

Supervisory server **104** monitors the packets passing through antenna station **102** and notices that an HTTP request is being transmitted from PDA **100** to server **110**. Supervisory server **104** is programmed to recognize requests sent to server **110**. Supervisory server **104** submits an update **602** to billing database **106** to indicate that the information providers associated with server **110** will be paying for the mobile Internet access of PDA **100**.

Meanwhile, HTTP request **600** is transmitted from antenna station **102**, over Internet **108**, to server **110**. As shown in **Figure 7**, server **110** replies by transmitting the requested document **700** through Internet **108** and antenna station **102** to PDA **100**.

Figure 8 depicts what happens when the user of PDA **100** next requests a web page associated with a different web server **804** and different information provider. An HTTP request **800** is sent from PDA **100** through antenna station **102**. This time supervisory server **104** detects that HTTP request **800** is directed toward server **804**, rather than server **110**. In response, supervisory server **104** submits an update **802** to billing database **106** to indicate that the information providers associated with server **110** are no longer assuming the charges for the mobile Internet access of PDA **100**. Meanwhile, the web request is forwarded through Internet **108** to server **804** for processing.

In a preferred embodiment, the operation depicted in **Figure 8** for ending billing intervention will be supplemented with a timer system so that the billing intervention ends a certain number of minutes after the last communication between PDA **100** and server **110**, so that the information providers associated with server **110** will not be continuously charged if PDA **100** is left operating with web server **110**'s website displayed.

Figure 9 is a diagram depicting a billing database in accordance with a preferred embodiment of the present invention. Table **900** maps an IP (network) address **902** of a mobile Internet device with a unique device ID **904** and an account number **906** to be charged for Internet access of the device. A mapping between IP address **902** and device ID **904** is helpful, since a device may be dynamically allocated an IP address each time an Internet connection is established. Thus, a given device only has one device ID, but may assume a different IP address each time it initiates a wireless Internet connection. Table **907** maps an account number **908** with a balance of charges **910**.

To change the party billed, as depicted in **Figure 6**, charged account field **906** is changed for the particular mobile Internet device in question. Balance field **910** for the intervening party is then charged, rather than the user of the device. Charged account field **906** can be simply changed back to the device user's account number when the default billing arrangement is to be restored.

Figure 10 is a flowchart representation of a process of billing intervention in accordance with a preferred embodiment of the present invention. A request for a web

document is received (step **1000**). If the request is for a website sponsored by an information provider which is (step **1002**), the information provider sponsoring the site is established as the billed party (step **1004**). If not, the process cycles to step **1000**.

Another web request is received (step **1006**). If this request is for a website sponsored by the same information provider and under the same terms (step **1008**), the process cycles back to step **1006**. Otherwise, the default billing arrangement, where the mobile Internet device user is charged, is restored (step **1010**), and the process cycles to step **1000**.

One of ordinary skill in the art will recognize that a number of variations may be made to the basic embodiment herein described, without departing from the scope of the claimed invention. For example, certain non-wireless Internet provider charge users for the amount of time spent online. The same billing intervention scheme could be used with non-wireless Internet customers, therefore, as all that is required to provide the same scheme is the ability to monitor network activity, which can be done with both wired and wireless network links.

Another contemplated variation on the basic embodiment herein described would be to have the web server being communicated with submit the IP address of the web client device (e.g., PDA **100** in **Figure 1**) to the web client's Internet service provider, rather than having the Internet service provider monitor the network activity between the client and server. The method by which the Internet service provider discovers that a communication between the client and web server is taking

place is unimportant, and any number of techniques may be used to perform this step.

It is important to note that while the present invention has been described in the context of a fully functioning data processing system, those of ordinary skill in the art will appreciate that the processes of the present invention are capable of being distributed in the form of a computer readable medium of instructions and a variety of forms and that the present invention applies equally regardless of the particular type of signal bearing media actually used to carry out the distribution. Examples of computer readable media include recordable-type media, such as a floppy disk, a hard disk drive, a RAM, CD-ROMs, DVD-ROMs, and transmission-type media, such as digital and analog communications links, wired or wireless communications links using transmission forms, such as, for example, radio frequency and light wave transmissions. The computer readable media may take the form of coded formats that are decoded for actual use in a particular data processing system.

The description of the present invention has been presented for purposes of illustration and description, and is not intended to be exhaustive or limited to the invention in the form disclosed. Many modifications and variations will be apparent to those of ordinary skill in the art. The embodiment was chosen and described in order to best explain the principles of the invention, the practical application, and to enable others of ordinary skill in the art to understand the invention for various embodiments with various modifications as are suited to the particular use contemplated.